

Patent Claims

1. Method for operating a mixed-potential exhaust-gas probe for an internal combustion engine having a heatable probe ceramic 1.3 with a first electrode 1.5, which is arranged in a chamber 1.6 and is subjected to the reference atmosphere and with a second electrode 1.4 which detects gas molecules and is arranged in the exhaust gas of the internal combustion engine, a pump voltage being applied between the first and second electrodes by means of a pump voltage source, so that, in the interior of the chamber 1.6, a somewhat reduced oxygen partial pressure is adjusted by the electrochemical pumping off of the oxygen molecules, characterized in that one applies a constant external voltage to the electrodes (1.4, 1.5) with this voltage deviating from the thermodynamic equilibrium voltage of the wanted reaction, measuring and evaluating the current dropping across the electrodes (1.4, 1.5).

2. Method of claim 1, characterized in that one determines the optimal voltage for detecting individual mixed potentials of individual components of the exhaust gas experimentally.

3. Method for operating a mixed-potential exhaust-gas probe for an internal combustion engine having a heatable probe ceramic 1.3 detecting gas molecules and having a first electrode 1.5 mounted in a chamber 1.6, the first electrode 1.5 being subjected to the reference atmosphere, and having a second electrode arranged in the exhaust gas of the internal combustion engine, wherein a pump voltage is applied between the first and second electrodes 1.4 with a pump voltage source so that a somewhat reduced oxygen

partial pressure is adjusted in the interior of the chamber 1.6 by electrochemically pumping off the oxygen molecules, characterized in that one applies a constant current to the probe ceramic and measures and evaluates the voltage adjusting between the electrodes (1.4, 1.5) with this voltage deviating from the thermodynamic equilibrium voltage of the desired reaction.

4. Method of claim 3, characterized in that one determines the current for detecting individual mixed potentials of individual components of the exhaust gas experimentally.

5. Circuit arrangement for carrying out the method of claim 1 or 2, characterized by an inverting operational amplifier, with a voltage divider R2 being connected to the non-inverting input of the operational amplifier and the exhaust-gas probe being connected to the inverting input of the operational amplifier and a reference resistor R1 being arranged in the feedback loop; and, a differential amplifier which amplifies the voltage difference between the non-inverting input and the output of the operational amplifier and outputs the difference as a measurement signal (voltage polarized current measurement, FIG. 4).

6. Circuit arrangement for carrying out the method of claim 3 or 4, characterized by a non-inverting operational amplifier having a non-inverting input and an inverting input, a voltage divider R2 being connected to the non-inverting input and a reference resistor R1 being connected to the inverting input, an exhaust-gas probe being arranged in the feedback loop of the operational amplifier and having a differential amplifier which amplifies the voltage difference at the sensor and outputs this

voltage difference as the measurement signal (current polarized voltage measurement, FIG. 5).

7. Circuit arrangement of claim 5 or 6, characterized in that a switching device is provided via which the circuit arrangement for the voltage polarized current measurement can be switched over to the circuit arrangement for current polarized voltage measurement.

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